

What is claimed is:

1. A template padding method for padding edges of at least one hole on a semiconductor mask, the mask being provided on a contact layer formed on a wafer for forming elements, light being impinged into the hole to develop an image of the hole on the contact layer, thereby, the wafer being doped to form semiconductor elements, the mask being divided into a plurality of cells and at least one cell having a hole, the method comprising the steps of:
determining a zone enclosing the hole on the mask, the zone containing a plurality of cells;
selecting a template adjacent one selected edge to be padded, the template containing the hole and parts of cells in the zone;
determining the padded length based on a diffraction result of the hole and cells on the template; and
padding all edges of the at least one hole.
2. The method of claim 1, wherein the zone is a collection of at least one bank of cells around the hole, each bank is formed by a plurality of cells formed as a closed loop.
3. The method of claim 2, wherein the template is a cell array formed by a plurality of adjacent banks with each bank having the same number of cells.
4. The method of claim 3, wherein the diffraction of the template for the hole is calculated and stored as a database.
5. The method of claim 4, wherein the diffraction of the template is determined by OPC.
6. The method of claim 5, wherein the diffraction of the template is determined by rule OPC.
7. The method of claim 6, wherein the diffraction of the template is determined by model OPC.
8. The method of claim 1, wherein the edges are lateral sides of the hole to be padded.
9. The method of claim 8, wherein the template has a plurality of cells aside the hole to be padded so that the hole to be padded is protruded from a pattern containing

- the cells in the template.
10. The method of claim 1, wherein the edges are corners of the hole to be padded.
11. The method of claim 10, wherein the template has a plurality of cells enclosing two outer edges of the corner.
- 5 12. The method of claim 2, wherein the zone is selected based on a feature size of the hole to be padded and a wavelength of light to be impinged into the hole for developing.
13. The method of claim 1, wherein the semiconductor element is a ROM.
14. The method of claim 13, wherein the cell is a transistor containing a source, a
10 drain and a channel.
15. The method of claim 14, wherein the channel is doped to form a resistor.
16. The method of claim 1, wherein the cells are arranged as an array.
17. A method for determining a padding length of a padded hole in a template, the
15 template containing a cell array and being a sub-set of a zone on a mask enclosing the padded hole, the cell array being formed by a plurality of adjacent banks each containing a predetermined number of cells, the method comprising the steps of:
- (b1) determining a geometrical relation of a selected cell to the at least one hole to be padded for a cell having a hole;
- (b2) determining a padding value according to diffraction of the selected cell and
20 the hole;
- (b3) determining cells in the template having the same geometrical relation to the padded hole as that in step (b1), the padding value being equal to that acquired from (b2);
- (b4) determining all the padding values for each cell in the template;
- 25 (b5) adding all of the padding values of each cells in the template; and
- (b6) determining a padding length according to the padding values for expanding an edge of the padded hole, wherein the edge of the hole to be expanded is one of edges of the hole nearest to the template.
18. The method of claim 17, wherein the edge of the hole to be expanded is one of the
30 edges nearest to a geometrical center of the template.
19. The method of claim 17, wherein the padding value is determined by experiments.

20. The method of claim 17, wherein the padding value is determined by calculation of diffraction of the padded hole to the selected cell.
21. The method of claim 17, wherein the padding value is determined by OPC method.
- 5 22. The method of claim 17, wherein the padding value is determined by rule OPC.
23. The method of claim 17, wherein the padding value is determined by model OPC.
24. The method of claim 17, wherein the step of determining the padding length based on the padding value is performed by experiments.
25. The method of claim 17, wherein the step of determining the padding length based
10 on the padding value is performed by calculation of diffraction.
26. The method of claim 17, wherein the step of determining the padding length based on the padding value is performed by OPC method.
27. The method of claim 17, wherein the step of determining the padding length based on the padding value is performed by rule OPC method.
- 15 28. The method of claim 17, wherein the step of determining the padding length based on the padding value is performed by model OPC method.
29. The method of claim 18, wherein the padding values for each template is stored in a database.